



Update on Regional Price Parities

2005-2009

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**Cost of Living and the Supplemental Poverty Measure
The Brookings Institution
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Overview of BEA-BLS-Census Collaboration

- Office of Prices and Living Conditions at the Bureau of Labor Statistics (BLS)
- Poverty Statistics Branch, Housing and Household Economic Statistics (HHES) at the Census Bureau
- BEA's focus in on average price comparisons
 - Not necessarily prices or expenditures by a particular income group
 - Possible adjustments: use different expenditure weights
 - Literature on exchange rates for the poor in global context (Deaton)

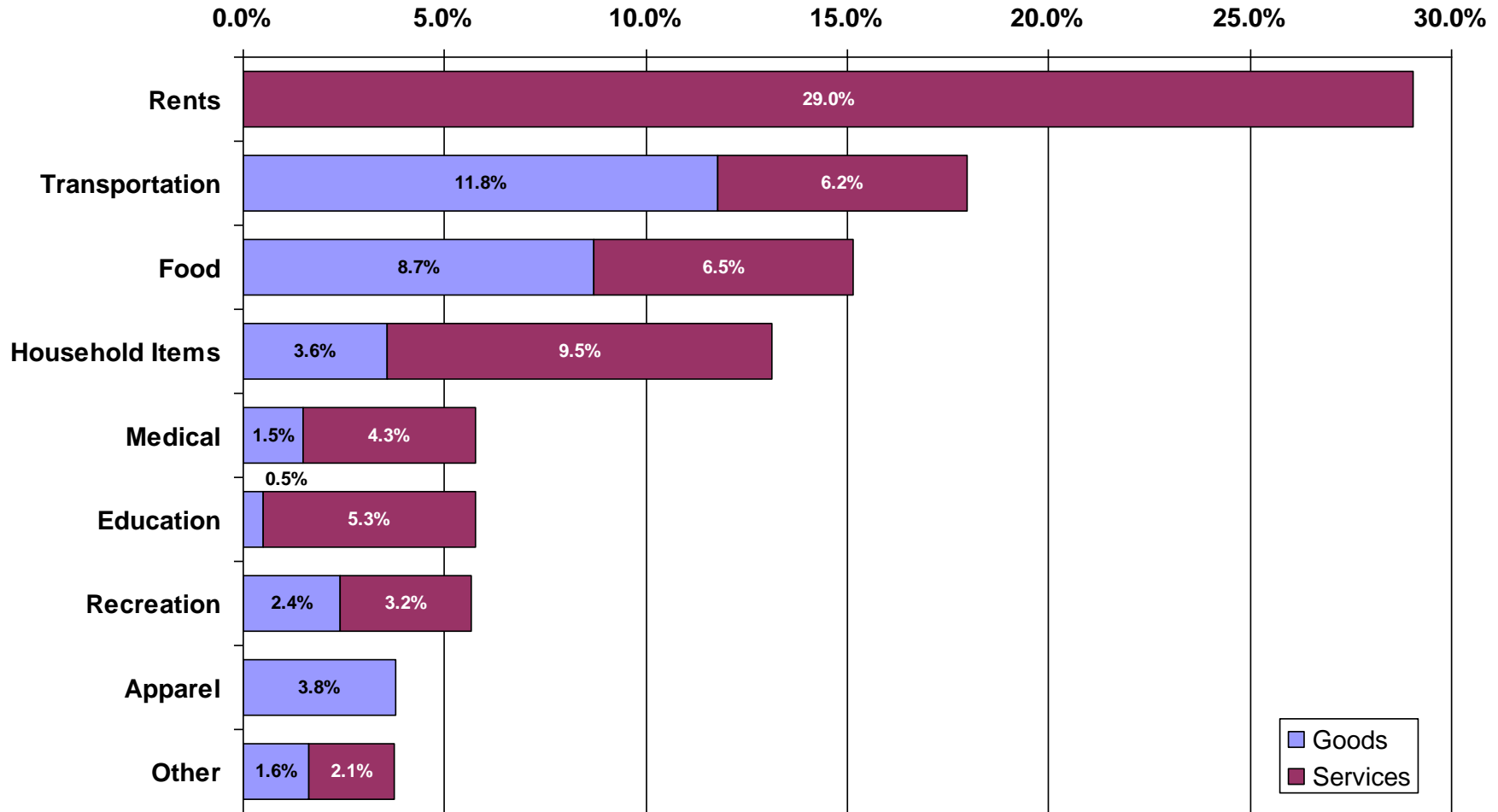
Overview of Data

1. **Consumer Price Index** (CPI) micro data on prices from BLS
 - 207 item strata, 38 urban and metropolitan areas (1 million obs / year)
 - Rents and Owners' Equivalent Rents (34,000 obs / year)

2. **Consumer Expenditure Survey** (CE) from BLS
 - 207 x 38 area-item level observations

3. **American Community Survey** (ACS) rents and owner costs of housing from Census
 - 5 year rolling average for all counties (10 million obs)

Expenditure Headings by Weight, Goods vs. Services



Methodology

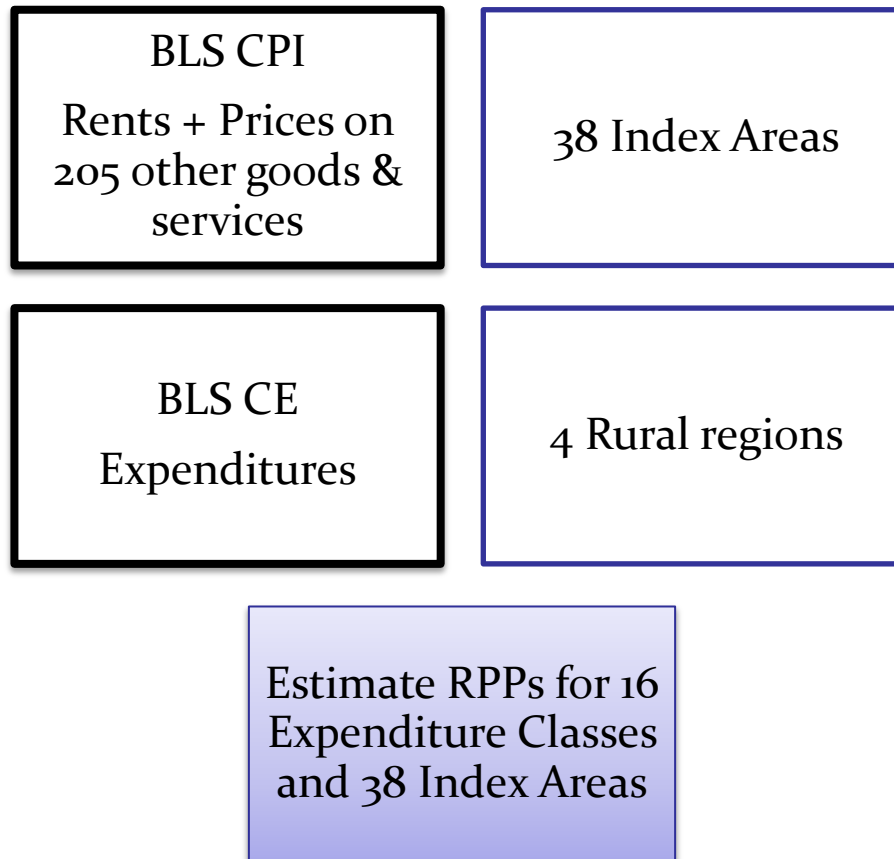
1. First Stage

- Hedonic regressions
- Multilateral aggregation
 - 38 CPI index areas
 - 207 detailed item prices to 16 expenditure headings

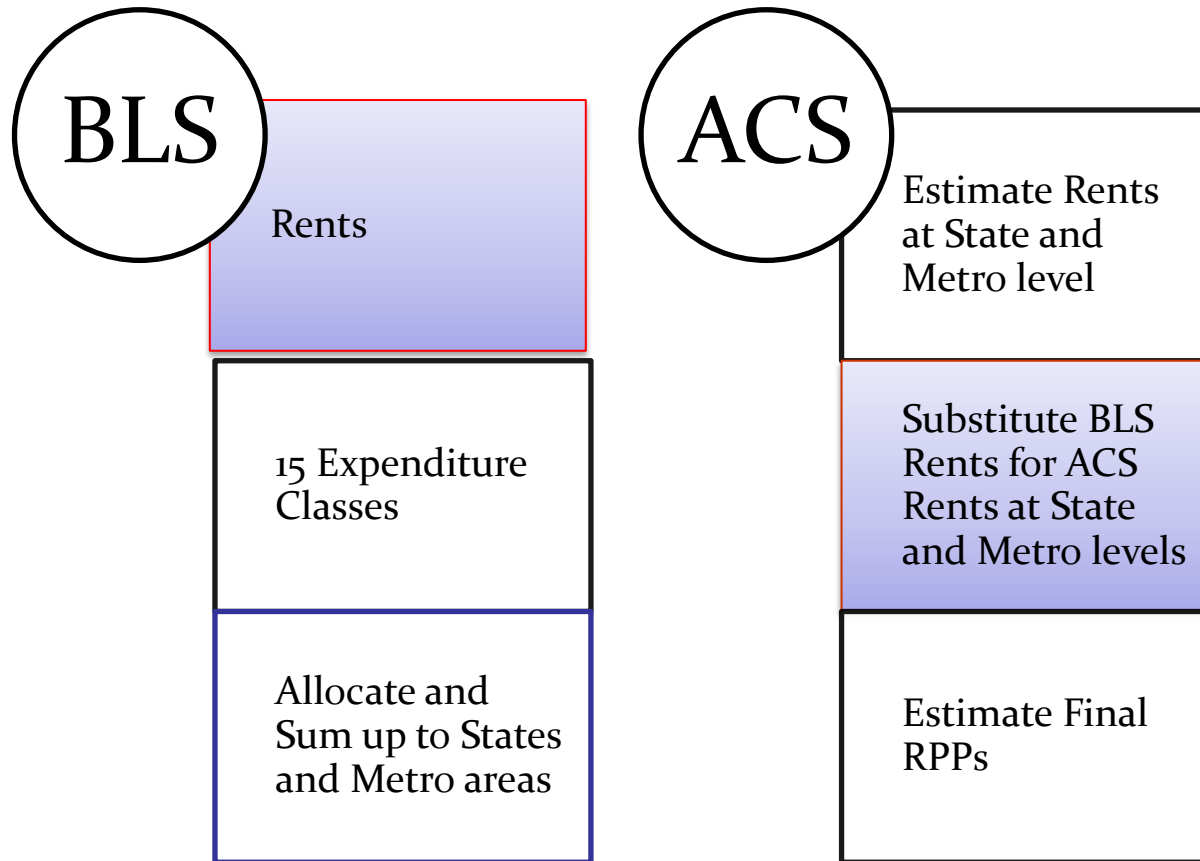
2. Second Stage

- American Community Survey
- Multilateral aggregation
 - 51 States and 366 Metro areas
 - 16 Expenditure headings to overall RPP

First stage: BLS data



Second stage: ACS data



Treatment of Rents

- Different concepts for Owners
 - BLS : owner equivalent rents
 - ACS : actual owner costs
- Different geographies
 - BLS: 38 Index areas
 - ACS: all counties and Urban/Rural within counties
- Timing:
 - BLS: annual
 - ACS: rolling multi-year average
- To use or not to use Owners?

Bureau of Labor Statistics

Collaboration with Consumer Price Index Division and Office of Prices and Living Conditions

- Same unit priced for both Rents and Owners' Equivalent Rents with an adjustment for utilities
- About 34,000 per year, representing urban population.
- Control for number of bedrooms, of rooms, type of unit (apartment, detached house, etc.), year built, parking, number of bathrooms, and heating and cooling availability interacted with Heating Degree Days and Cooling Degree Days
- Geographic coefficients by 38 BLS Index Areas

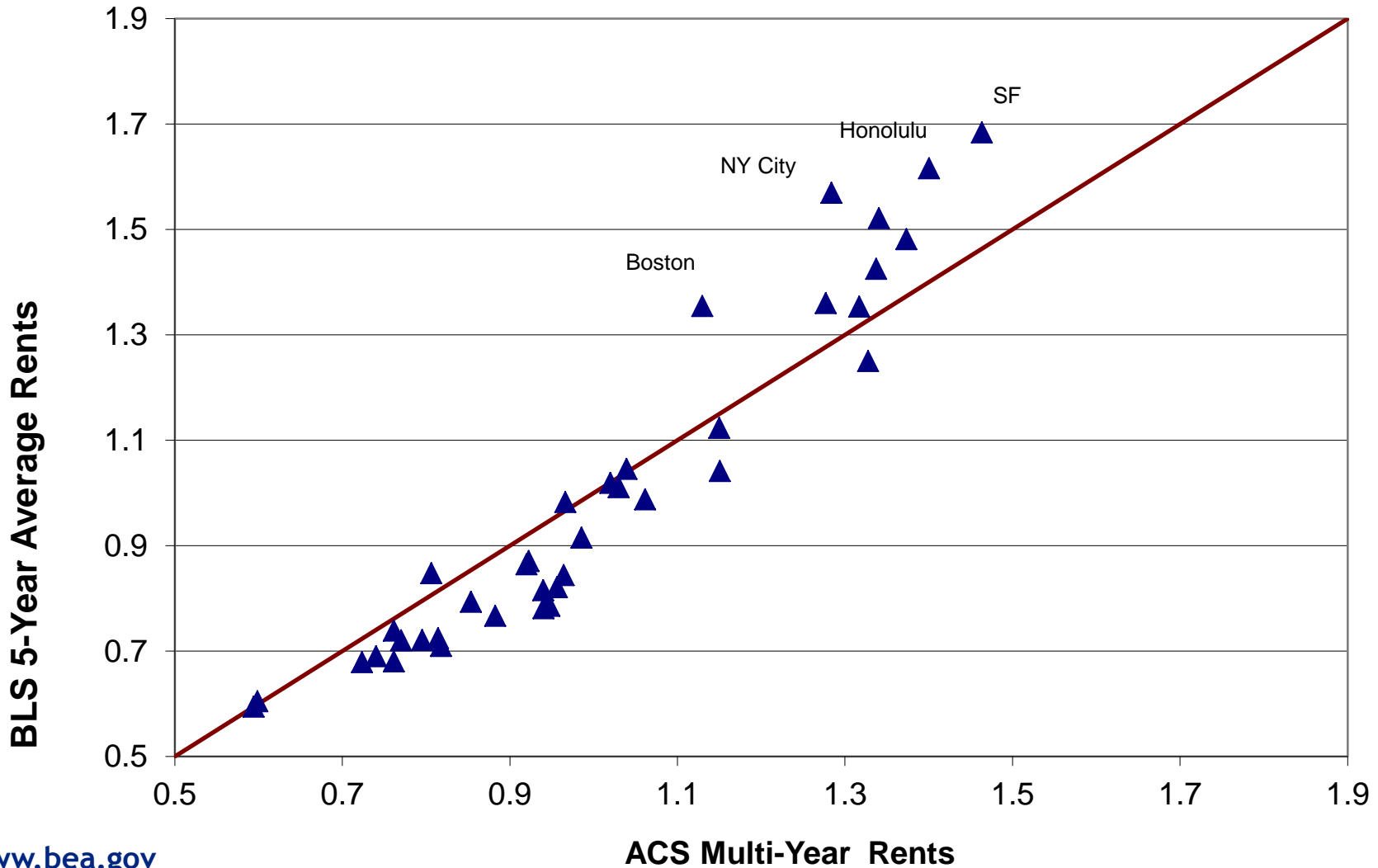
American Community Survey

Collaboration with the Poverty Statistics Branch of the Housing and Household Economic Statistics Division (HHES) of the Census Bureau

- 5 year rolling average for all counties in the U.S.
- About 3 million observations on rents in the housing survey
- Control for number of bedrooms, type of unit (apartment, detached house, etc.), year built, total number of rooms, and the survey year (2005-2009)
- Geographic coefficients by state (51 including DC), metro areas (366 as defined by OMB) and three groupings (metro, micro and rural) also OMB defined

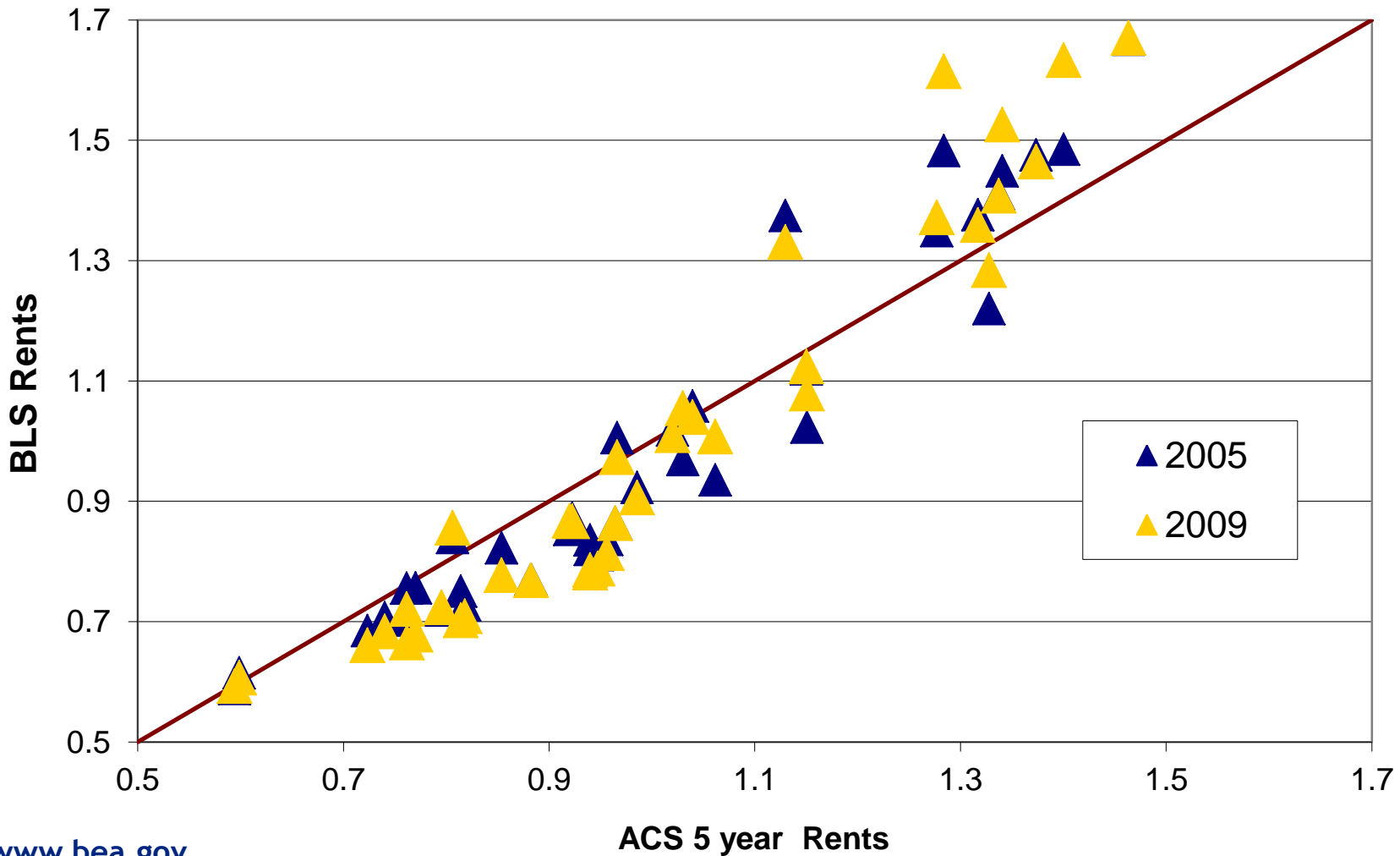
Comparison of Rents: BLS and ACS

ACS vs BLS Rents Only



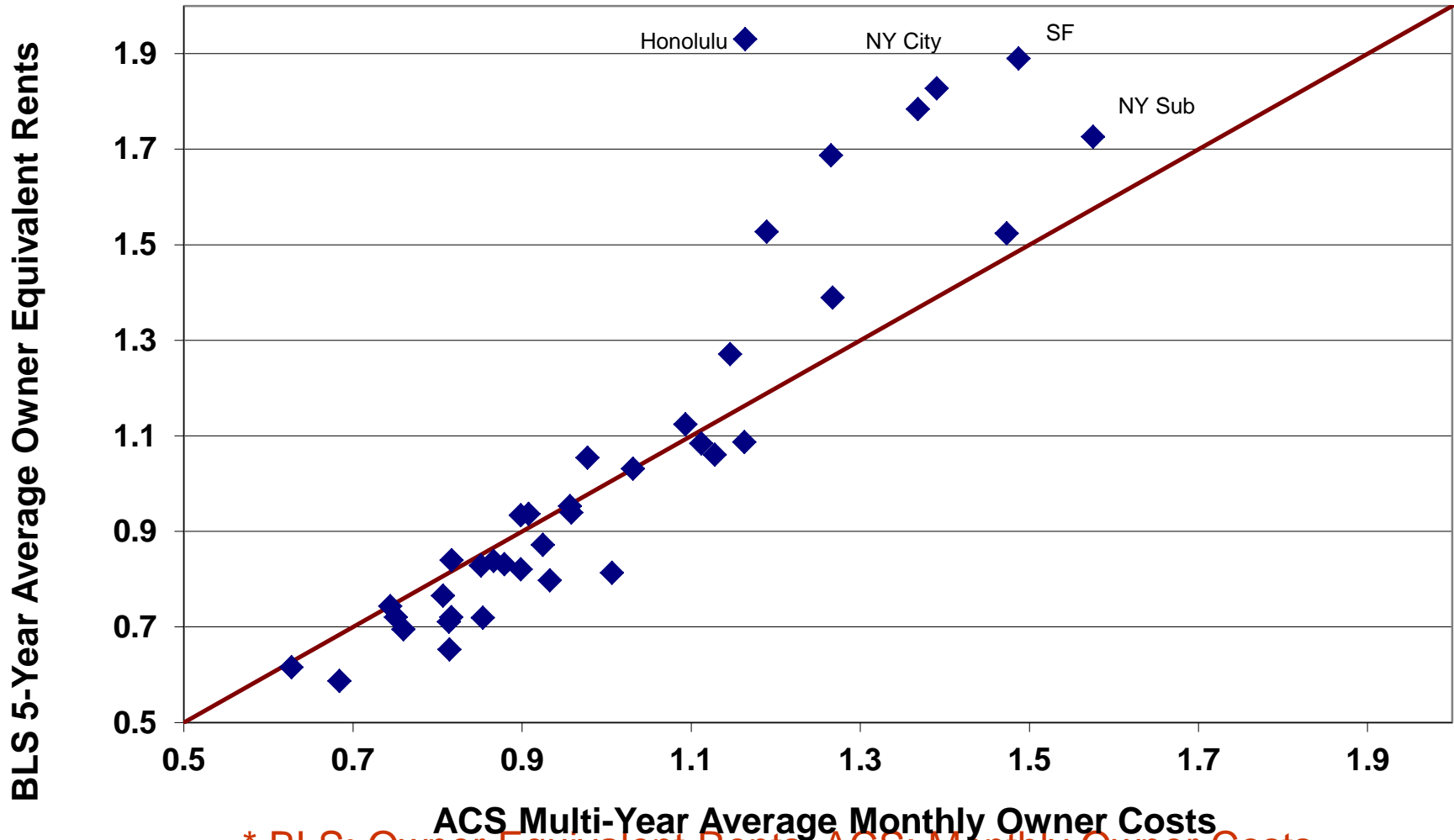
Comparison of Rents: BLS and ACS

ACS vs BLS Rents Only



Comparison of Owners: BLS and ACS*

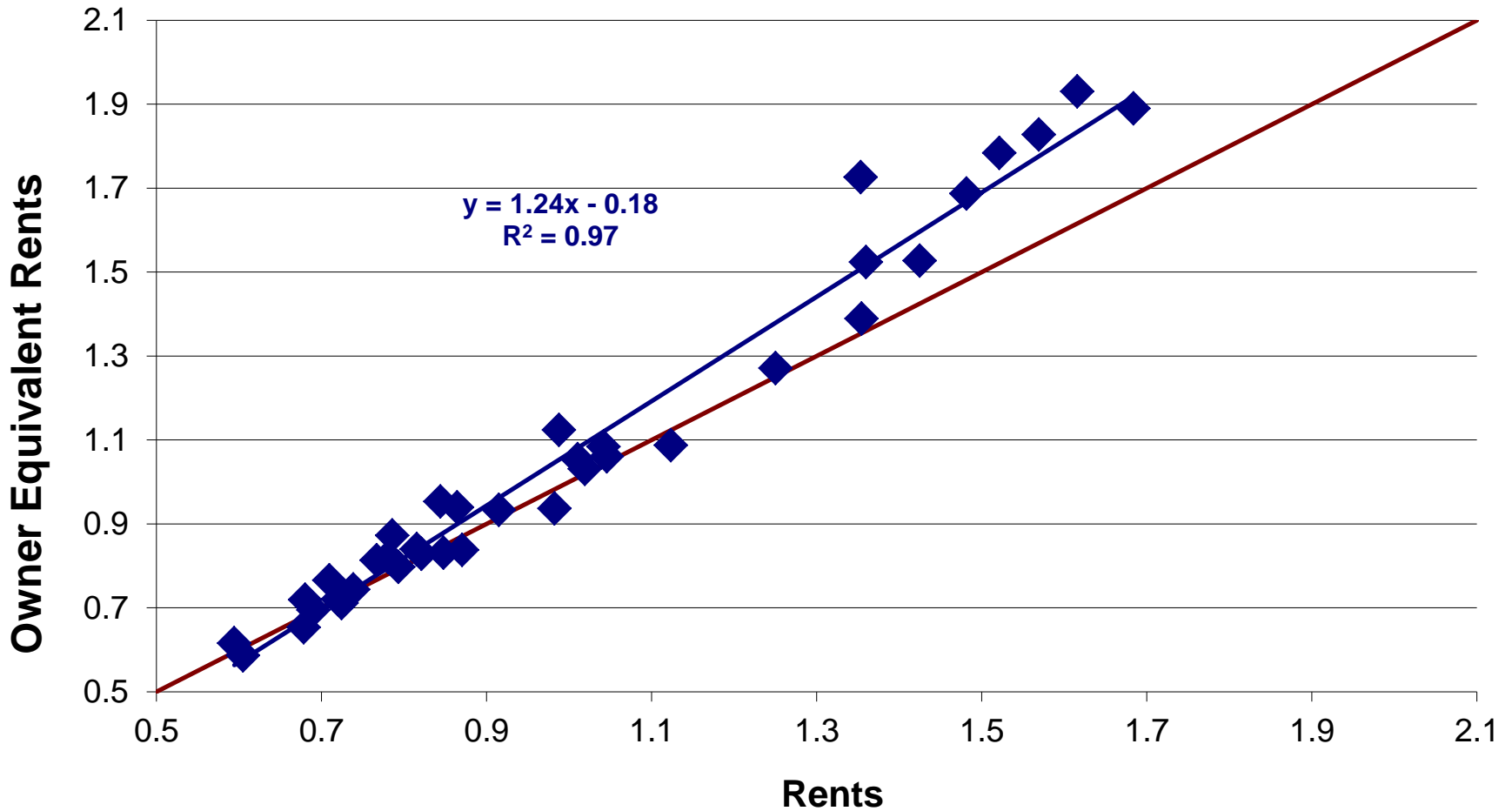
ACS vs BLS Owners Only



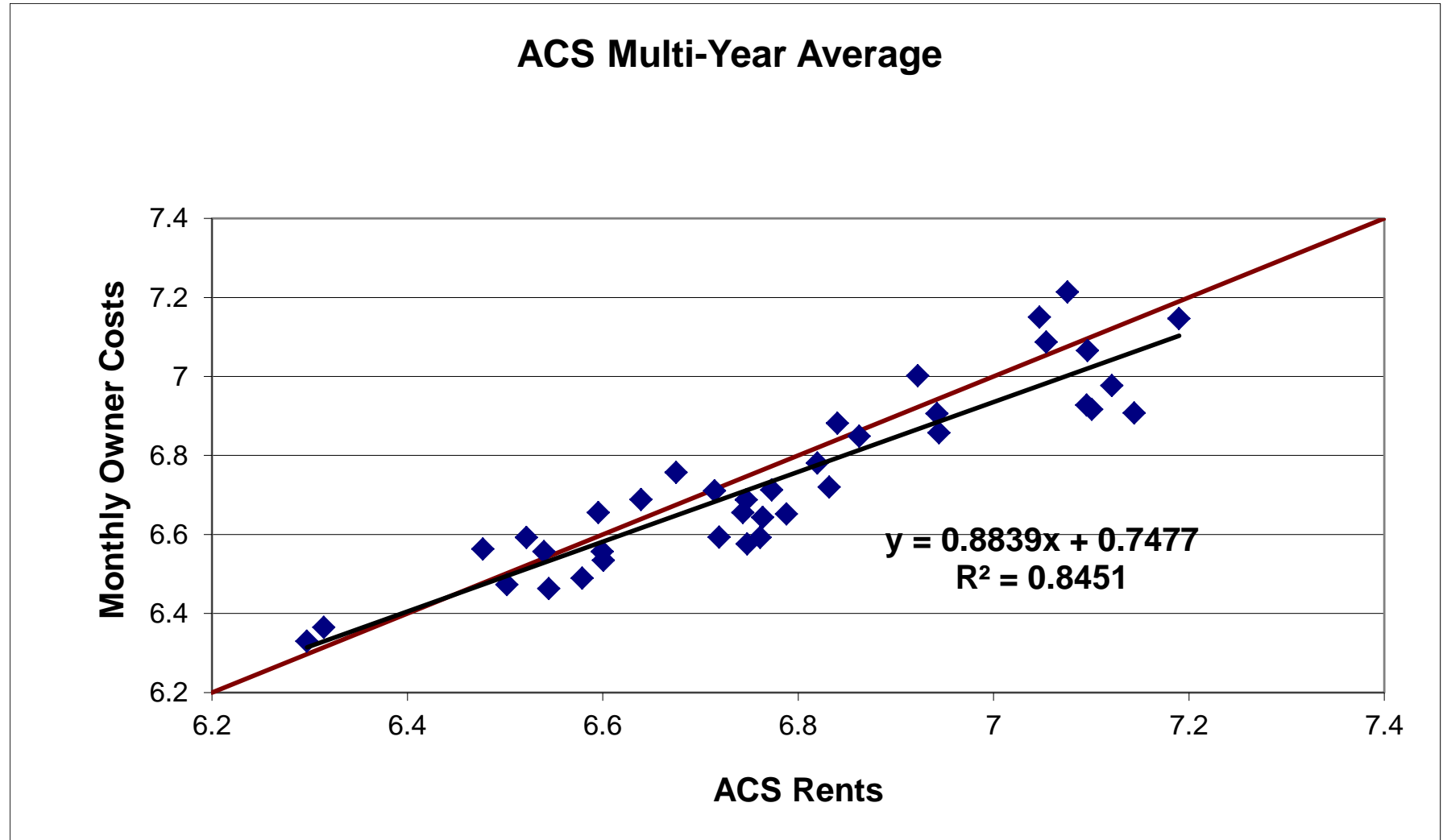
* BLS: Owner Equivalent Rents, ACS: Monthly Owner Costs

Comparison of Rents and Owners: **BLS only**

BLS 5-year average



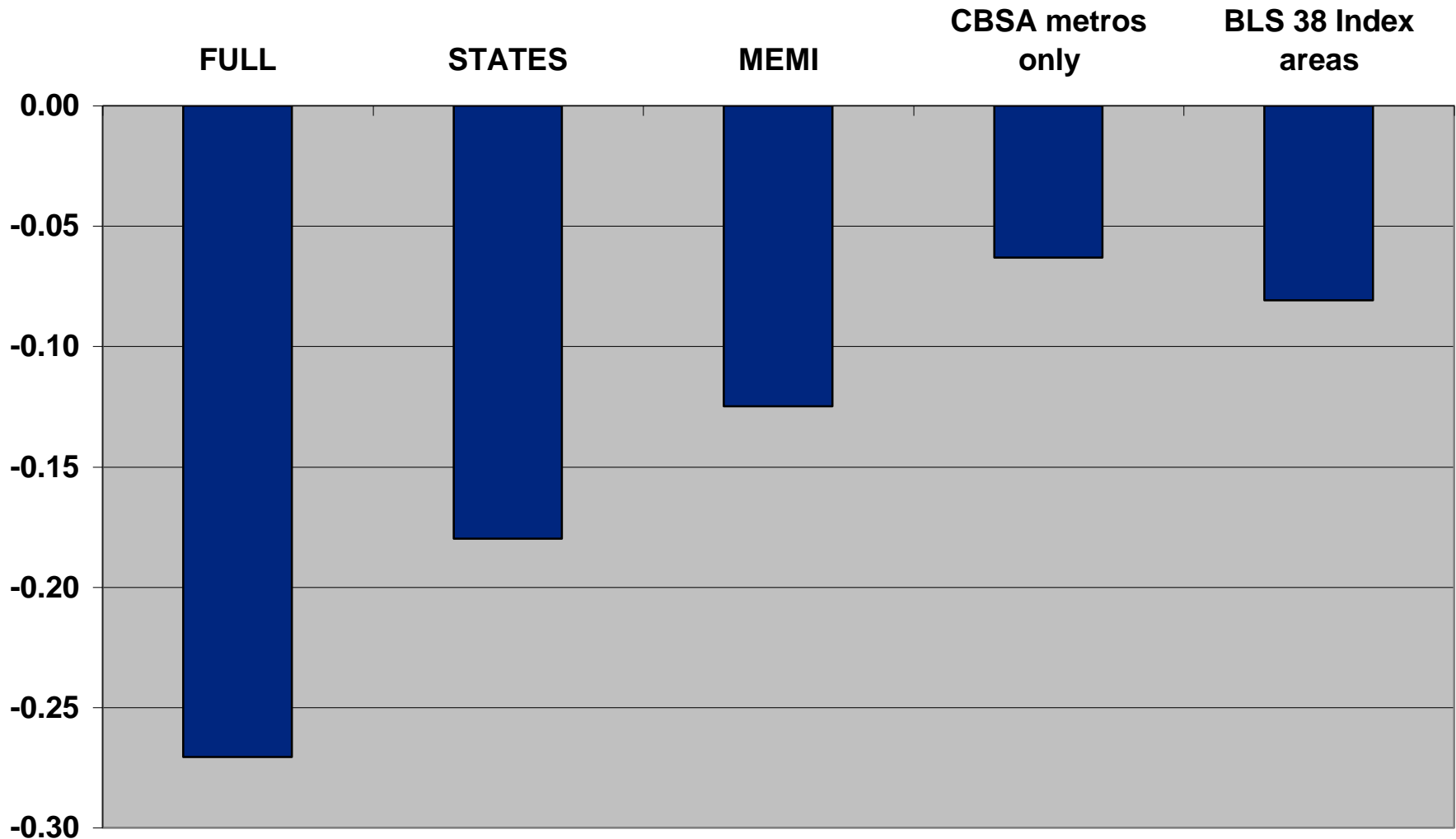
Comparison of Rents and Owners*: ACS only



*Monthly Owner Costs: With Tenure dummy

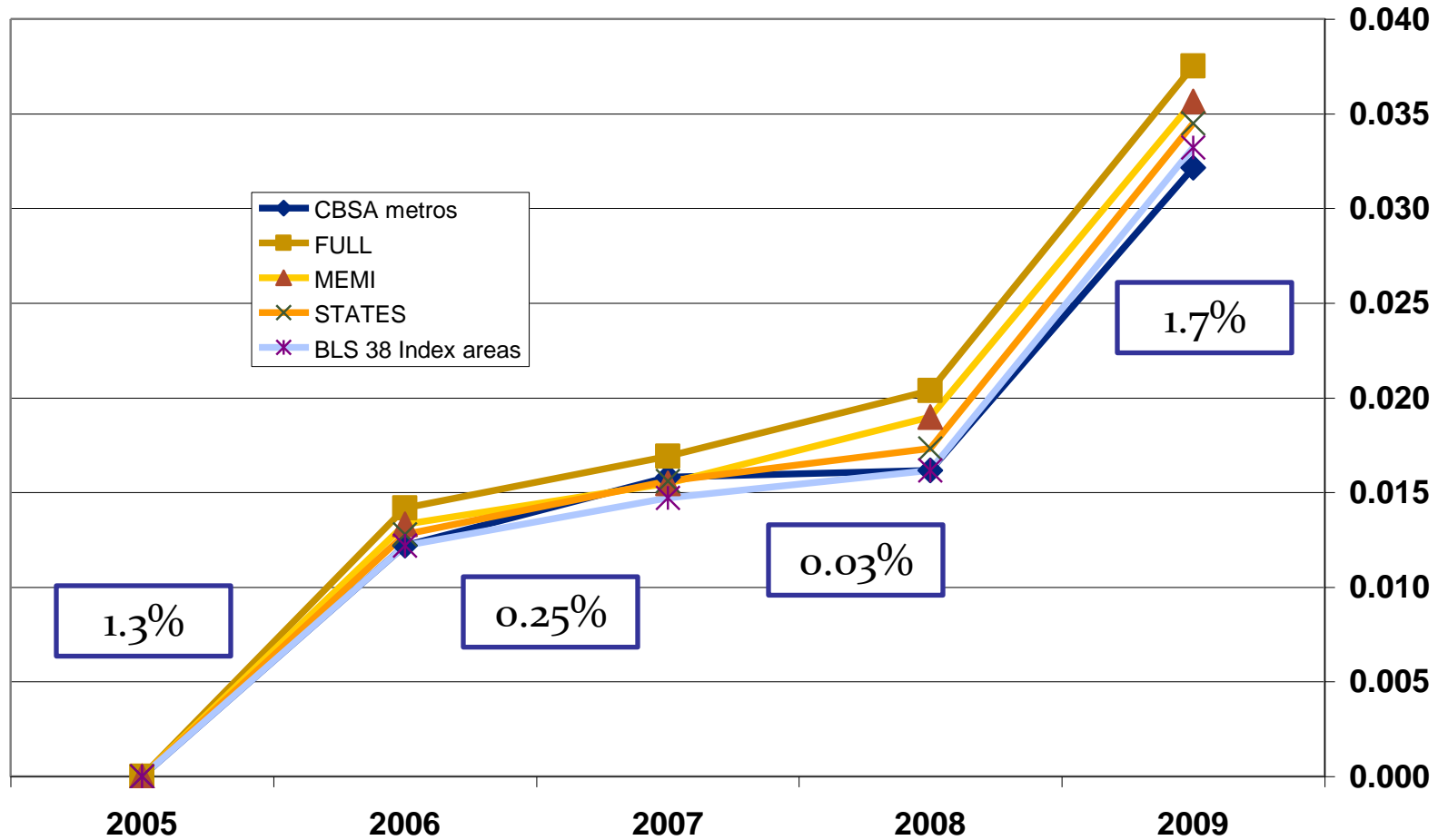
ACS Rents

Rural Coefficient (Urban = 0)



ACS Rents: Coefficients

ACS RENTS: Survey Year Coefficients



Allocation to States and Metros

- We do not have price levels below the 38 areas covered by the CPI (Consumer Price Index)
- We **do** have Expenditure Weights for 38 areas plus 4 rural regions covered by the Consumer Expenditure survey and used in the Rural-CPI estimates
- **Assumptions:**
 - Price levels of the counties within BLS areas equal the price level of the BLS area (for each of the 16 expenditure classes).
 - Expenditure weights within areas proportional to population, i.e., per capita expenditure weights uniform across counties within an area
- Find the expenditure-weighted geometric mean of the price levels, by year, expenditure class and state/metro areas.

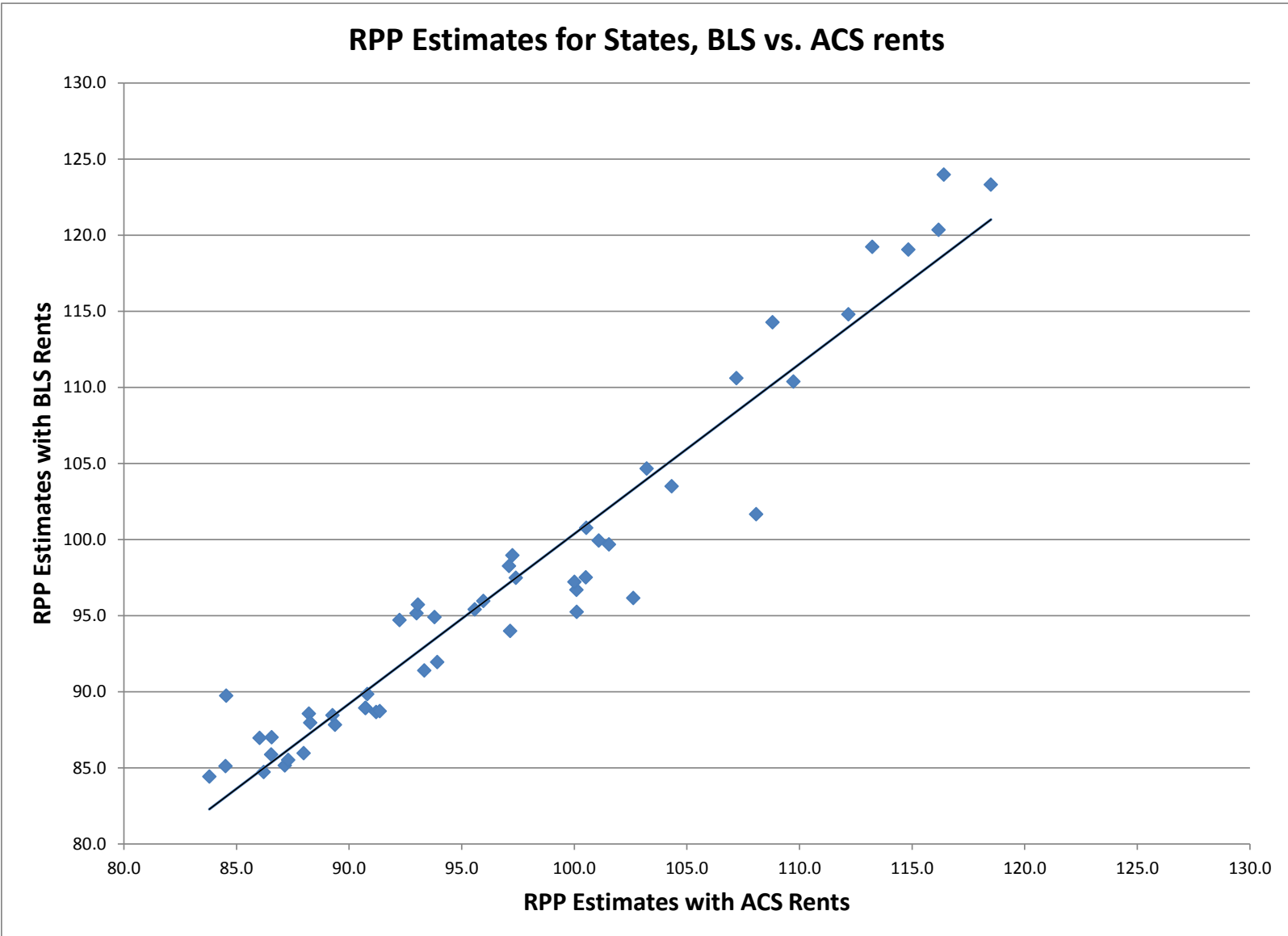
Final Aggregation

- Replace the allocated BLS (annual) Rents with the ACS (multiyear) Rents estimated directly from the Census
 - By metropolitan, micropolitan and rural areas
 - By 363 Metropolitan areas
 - By 50 States plus DC

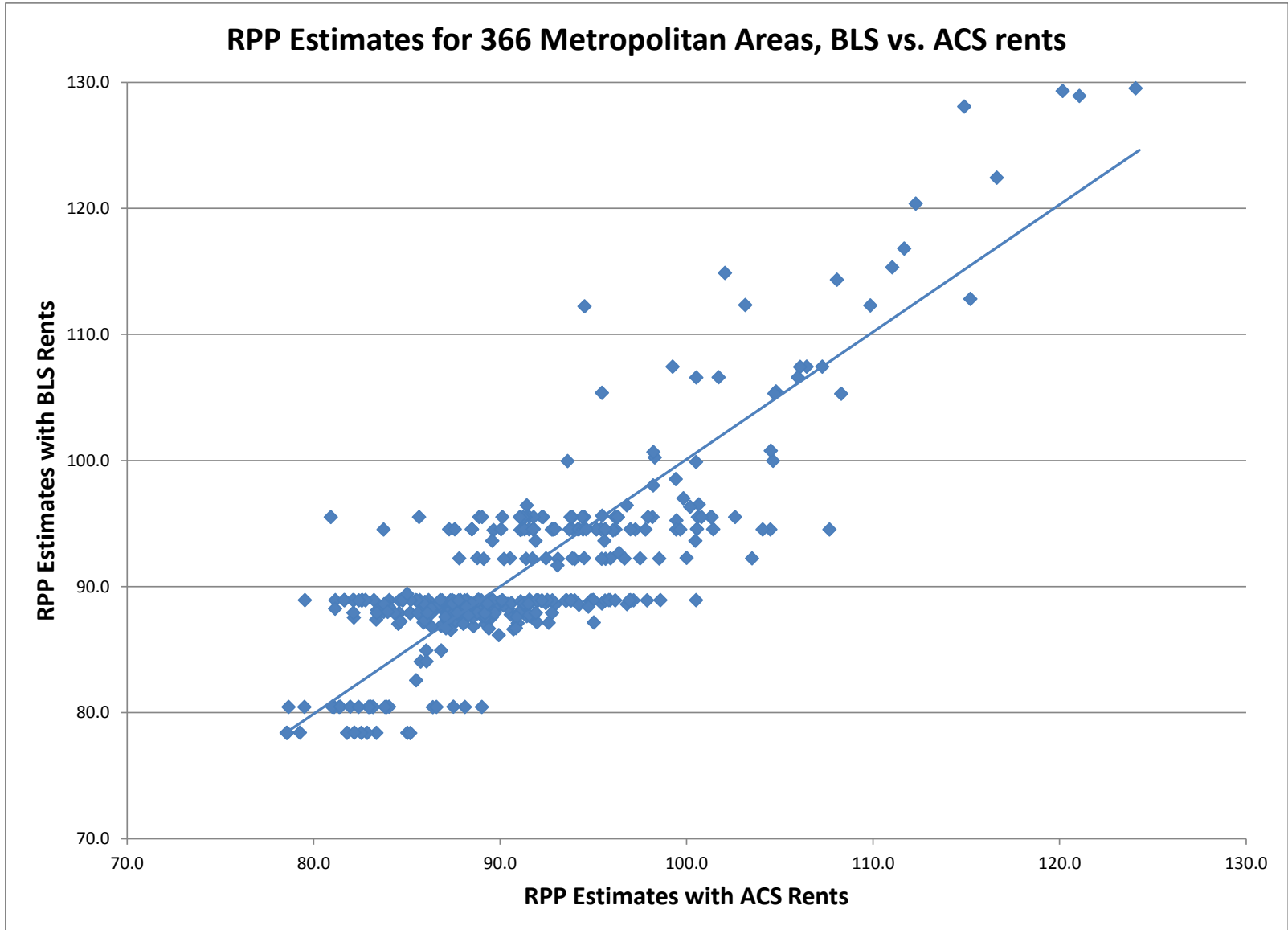
- Stack the 5 years and estimate the multiyear RPPs by 16 Expenditure Classes

- Does it make a difference whether we use BLS 5-year annual averages or ACS multi-year average for Rents?

Final RPPs by State

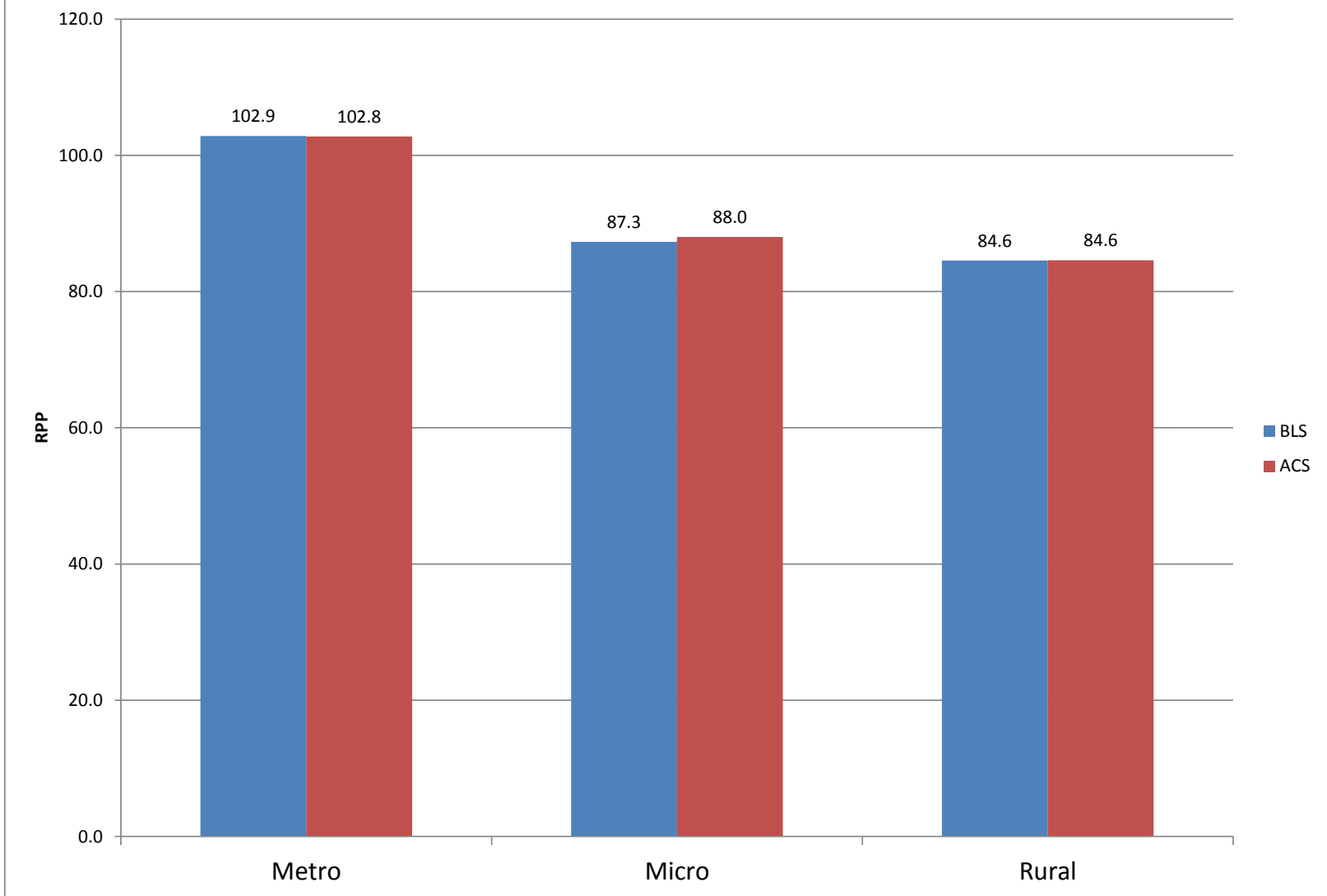


Final RPPs by Metro areas



Final RPPs by Metro/Micro/Rural areas

RPP Estimates for all Metro, Micro, and Rural Areas, BLS vs. ACS rents



RPPs by Expenditure Class

Expenditure Class		Rural 10%	Micro 7%	Metro 83%	All 100%
Apparel	Goods	84	89	103	100.1
Food	Goods	95	97	101	99.7
Food	Services	92	94	101	100.0
Housing	Goods	88	92	102	99.8
Housing	Services	88	91	102	99.9
Rents	Services	67	75	106	100.6
Transport	Goods	98	98	100	99.3
Transport	Services	90	92	102	100.2
Overall		84.7	88.1	102.8	100.0

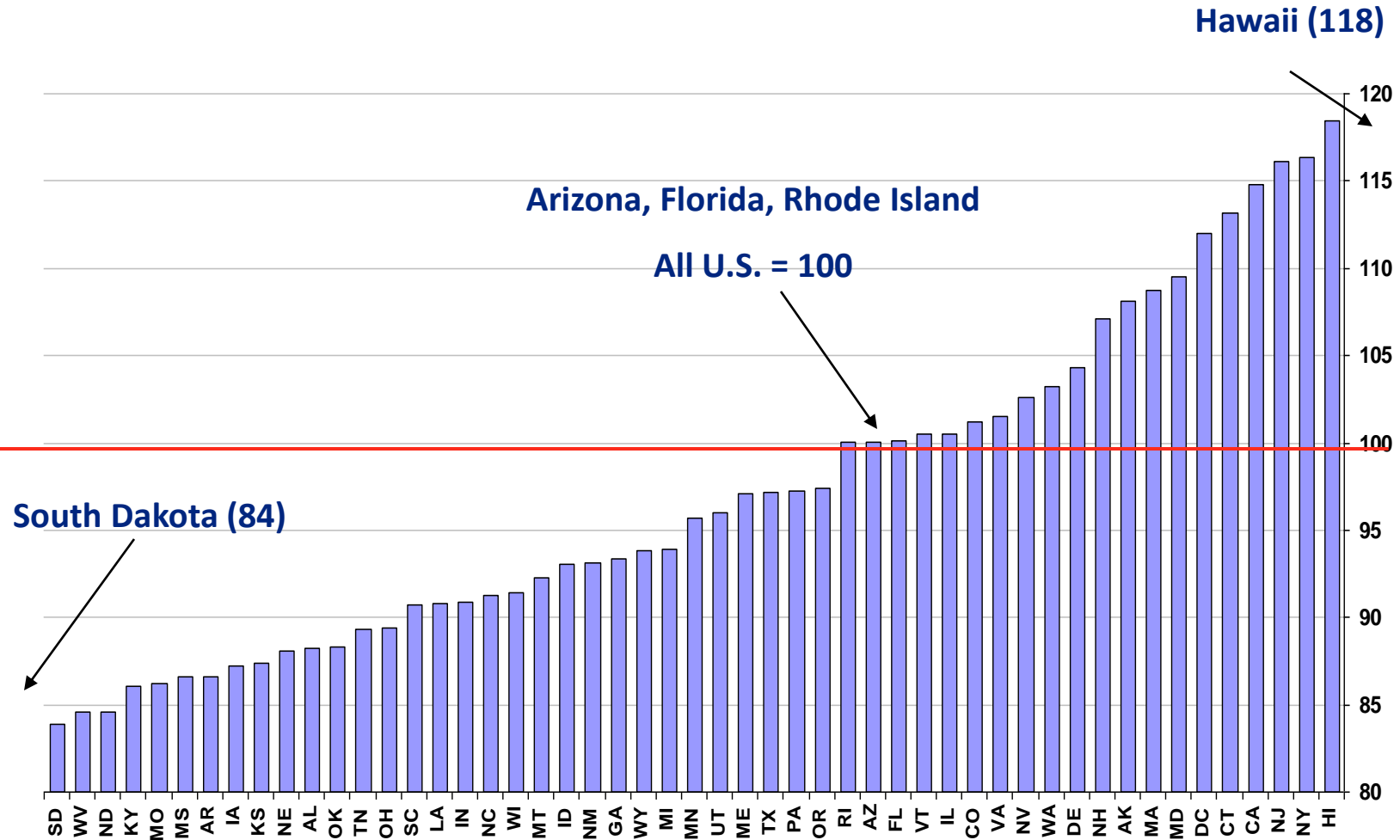
RPPs by Expenditure Class

Expenditure Class		Rural	Micro	Metro	All
		10%	7%	83%	100%
<div style="border: 1px solid black; padding: 5px;"> Rental costs are 1.6 times higher on average in Metro vs. Rural areas (106 / 67) </div>			89	103	100.1
			97	101	99.7
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RPPs by Expenditure Class

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Rural areas tend to have more inexpensive services relative to goods.			89	103	100.1
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5-Year Average RPPs by State



Application

- Use the final 5 year-average price level to adjust the Personal Income estimates by State and Metro Areas
- The RPP is the nominal (unadjusted) income divided by the adjusted income for each area and each year.

RPP Adjusted Personal Income

State Per Capita Personal Income (\$)				
	2005		2009	
State	Unadjusted	Adjusted	Unadjusted	Adjusted
Alabama	29,843	33,884	33,360	37,857
DC	54,918	49,135	68,013	60,817
Louisiana	30,086	33,217	37,520	41,401
Mississippi	26,808	31,031	30,426	35,198
New York	40,687	35,038	46,459	39,986
North Carolina	32,037	35,192	34,719	38,116
South Carolina	29,226	32,276	32,338	35,692
Texas	33,185	34,225	38,546	39,732
Virginia	38,966	38,470	44,129	43,542
West Virginia	26,685	31,613	32,067	37,967
All U.S.	35,424		39,626	

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Future Developments

- Allocate total expenditure weights to areas using Earnings or Wages and Salaries
- Evaluate using owner cost data as well as rents in the ACS
- Evaluate using both BLS rents and owner equivalent rents as well as ACS housing data
- Evaluate using expenditure weight share of Rents from BEA's National Income and Product Accounts as well as from BLS' Consumer Expenditure survey
- Expand RPP to other components of Income / Product

Selected References

- ACS estimates of geographic differences can be found at:
<http://www.census.gov/hhes/povmeas/publications/working.html>
- Deaton, Angus. “Price Indexes, Inequality, and the Measurement of World Poverty.” *American Economic Review* 2010, 100:1, 5-34.
- Deaton, Angus and Olivier Dupriez. “Purchasing Power Parity Exchange Rates for the Global Poor.”
http://princeton.edu/~deaton/downloads/Purchasing_power_parity_exchange_rates_for_global_poor_Nov11.pdf
- Renwick, Trudi. “Alternative Geographic Adjustments of U.S. Poverty Thresholds: Impact on State Poverty Rates.” *U.S. Census Bureau* 2009,
<http://www.census.gov/hhes/www/povmeas/papers/Geo-Adj-Pov-Thld8.pdf>
- Verbrugge, Randal and Thesia Garner. “Reconciling User Costs and Rental Equivalence: Evidence from the U.S. Consumer Expenditure Survey.” *U.S. Bureau of Labor Statistics* 2009, *Working Papers* 247.